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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/582,625	06/12/2006	Chunguo Feng	034257R002	2786

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EXAMINER	
MYERS, JESSICA L	

ART UNIT	PAPER NUMBER
3746	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/582,625	FENG ET AL.	
	Examiner	Art Unit	
	JESSICA L. MYERS	3746	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *6/12/2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-8* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-8* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *12 June 2006* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *6/12/2006*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Drawings

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the "seal bushings" of claim 2 must be better shown, since it is unclear what arrow 26 is pointing to in figure 2. Additionally, the "alloy layers on the inside surfaces of the supporting guides" as disclosed in claim 5, and the "oil tube leading to the ground surface" and "the windings terminal", and the "overground numerical control unit" of claim 8 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner,

the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

In Reference to Claim 8

2. Claim 8 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. A windings terminal from the stator that leads to the surface is never shown, and neither is a surface power unit. It is unclear how power from the surface would be fed to the submerged stator without connection terminals and wires.

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

In Reference to Claim 1

4. Claim 1 recites the limitations "the supporting guides", “the oil tube,” “the balancing sieve tube,” “the end plug,” and “the end coupler”. There is insufficient antecedent basis for these limitations in the claim.

In Reference to Claim 2

5. Claim 2 recites the limitations "supporting guides", and “the endcovers”. There is insufficient antecedent basis for these limitations in the claim.

In Reference to Claim 5

6. Claim 5 recites the limitations "the reciprocating head’s solid shaft", “the circular iron cores,” and “the alloy layers”. There is insufficient antecedent basis for these limitations in the claim.

In Reference to Claim 7

7. Claim 7 recites the limitations "the pump cylinder", and “the plunger push rod”. There is insufficient antecedent basis for these limitations in the claim.

In Reference to Claim 8

8. Claim 8 recites the limitation "the overground numerical control unit”. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

10. Claims 1-3, 7, and 8 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent 6,203,288 to Kottke (Kottke).

In Reference to Claim 1

Kottke teaches a numerically controlled reciprocating submersible pump apparatus (see figures 1 and 2), comprising a sieve tube (cylinder (14)), a drive (drive system (50)) and a pump (pump (10)), the whole apparatus is placed in underground oil reservoirs (A recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations, and the apparatus is disclosed as being useable inside a sump (120), as shown in figure 2); The drive consists of a stator (stator (52)) and a reciprocating head (armature (62)), with iron cores (magnetically soft pole pieces (54)) inside the stator; The stator and the reciprocating head form a friction couple via the supporting guides (the armature is supported frictionally by bushings (15)) and the reciprocating head iron cores (the bushings interface with the armature's pole pieces (66)); Characterized in that, with an airtight cavity (there is an airtight cavity between the armature and the stator used to ensure that the stator does not get wet, see column 13 lines 18-30), the stator's upper end is connected to the pump's lower end through the sieve tube (The entire stator is mounted on the outside of the sieve tube, and the pump's lower end consists of the bottom of the sieve tube. Thus the stator's upper end is connected to the lower end of the pump, since both are located on the sieve tube); The pump is connected to the oil tube (the bottom of the pump is connected

to an outlet valve (36) which contains a conduit for the pumped fluid); The stator's lower end is connected to the balancing sieve tube, the end plug and the end coupler serially (The entire stator is mounted on the outside of the sieve tube, so the bottom of the stator is connected to the sieve tube. The sieve tube has a bottom end plug (opposed end (24)), which has an end coupler attaching it to inlet and outlet valves (34, 36)).

In Reference to Claim 2

Kottke teaches the numerically controlled reciprocating submersible pump apparatus, according to claim 1 (see the rejection of claim 1 above), characterized in that there are many circular iron core winding groups (a plurality of coiled wire windings (56) are sandwiched between pole pieces (54)) inside the stator frame with supporting guides between the winding groups (the bushings (15) are located radially inside of the core winding groups); The iron cores and the circular windings are arranged next to each other (see figure 1), There are seal bushings on the circular inside surfaces (See figure 1, where the sieve tube also serves as a seal bushing in addition to the bushings (15), since it seals the stator from the inside of the pump assembly); The seal bushings are connected to the endcovers (The sieve tube has endcovers in opposed ends (24 and 26)); All these form the airtight cavity (The inside of the sieve tube is airtight).

In Reference to Claim 3

Kottke teaches the numerically controlled reciprocating submersible pump apparatus, according to claim 2 (see the rejection of claim 3 above), characterized in that the stator's radially wound windings are arranged axially (The windings (56) are arranged axially along the length of the sieve tube).

In Reference to Claim 7

Kottke teaches the numerically controlled reciprocating submersible pump apparatus, according to claim 1 (see the rejection of claim 1 above), characterized in that there is a pump housing outside the pump cylinder (The sump (120) of figure 2 surrounds the sieve tube (14)), forming a circular space between them for sand residue (There is an annular space between the two); The plunger push rod is connected to the reciprocating head shaft's upper end through the sieve tube (The plunger head (13) is connected to the sieve tube (14) by sealing member (17). The sieve tube is connected to the shaft's (65) upper end by compression spring (78)).

In Reference to Claim 8

Kottke teaches the numerically controlled reciprocating submersible pump apparatus, according to claim 1 (see the rejection of claim 1 above), characterized in that the oil tube leads to the ground surface (As shown in figure 2, the outlet of the pump leads through sealed connection (138) that leads away from the sump (120)); Windings' terminal from the stator is connected to the overground numerical control unit (As can be seen in figure 2, the electronics and power supply package (60) is also located external to the sump (120)).

11. Claims 1, 2, 3, 7, and 8 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent 4,687,054 to Russell et al. (Russell et al.).

In Reference to Claim 1

Russell et al. teach a numerically controlled reciprocating submersible pump apparatus (see figure 2a and 2b), comprising a sieve tube (tubing section (208)), a drive (linear motor (200)) and a pump (sucker rod oil pump (350)), the whole apparatus is placed in underground oil reservoirs (see abstract); The drive consists of a stator (including coil assemblies (240, 242, 244, and 246)) and a reciprocating head (linear armature (300)) with iron cores inside the stator (each coil assembly has a wire winding (250) which is sandwiched by pole pieces (252 and 254)); The stator and the reciprocating head form a friction couple via the supporting guides and the reciprocating head iron cores (The inner tube (222) forms a frictional support for the linear armature which includes magnetic armature sections (316, 318, 320 and 322)); Characterized in that, with an airtight cavity, the stator's upper end is connected to the pump's lower end through the sieve tube (The stator's upper end is connected to the stator's lower end via cylindrical case (214). The cylindrical case is connected to sieve tube (208) via a connector (lower end cap (218)). The sieve tube is then connected to the base of the pump assembly via seat (360)); The pump is connected to the oil tube (The pump is connected to a mandrel (304) with a hollow channel (306) that serves to carry the oil to the surface); The stator's lower end is connected to the balancing sieve tube, the end plug and the end coupler serially (The lower end of the stator is connected to the sieve tube via connector (218). The sieve tube includes on its lower end nylon ring plugs (362, 364, and 366) which are held by a connector seat (360)).

In Reference to Claim 2

Russell et al. teach the numerically controlled reciprocating submersible pump apparatus, according to claim 1 (see the rejection of claim 1 above), characterized in that there are many circular iron core winding groups (240, 242, 244, 246) inside the stator frame with supporting guides between the winding groups (The cylindrical case (214) and the inner tube (222) hold the winding groups in place, and the inner tube is held radially between the winding groups.); The iron cores and the circular windings are arranged next to each other (see figure 2a), There are seal bushings on the circular inside surfaces (nylon centralizers (324, 326, 328, and 330) contact the inner surface of inner tube (222)); The seal bushings are connected to the endcovers (The nylon centralizers contact the inner tube (222) which is connected to the upper end cap (212) and lower end cap (218)); All these form the airtight cavity (The cavity between the armature and the stator is airtight).

In Reference to Claim 3

Russell et al. teach the numerically controlled reciprocating submersible pump apparatus, according to claim 2 (see the rejection of claim 2 above), characterized in that the stator's radially wound windings are arranged axially (see figure 2a, where the windings are arranged axially along the length of the tubes).

In Reference to Claim 7

Russell et al. teach the numerically controlled reciprocating submersible pump apparatus, according to claim 1 (see the rejection of claim 1 above), characterized in that there is a pump housing outside the pump cylinder (the sieve tube (208) is located outside of the pump's tube (barrel (352))), forming a circular space between them for

sand residue (This space could be used to collect sand and residue); The plunger push rod is connected to the reciprocating head shaft's upper end through the sieve tube (Drive rod (374) is connected to the sieve tube (208) via threaded coupling (308) and lower end cap (218), which also serve to connect it to the mandrel (304) that reciprocates the armature.).

In Reference to Claim 8

Russell et al. teach the numerically controlled reciprocating submersible pump apparatus, according to claim 1 (see the rejection of claim 1 above), characterized in that the oil tube leads to the ground surface (see figure 2a where upper tubing section (204) eventually leads to the surface); Windings' terminal from the stator is connected to the overground numerical control unit (computer (38) controls the windings, but is itself located above ground (see the abstract)).

Claim Rejections - 35 USC § 103

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

In Reference to Claim 4

Kottke teaches the numerically controlled reciprocating submersible pump apparatus, according to claim 2 (see the rejection of claim 2 above), characterized in

that the supporting guides have smaller inside diameters than the seal bushings (The bushings (15) have a smaller inside diameter than the sieve tube (14) which serves as a seal bushing located on the inside of the stator). However, Kottke does not teach that the supporting guides are made from alloy or that the circular inside surfaces are made from alloy.

Kottke does make note of a further embodiment that uses a stainless steel bellows member (310). It would have been obvious to one of ordinary skill in the art at the time of invention to form the bushings (15) and inside surface of the sieve tube (14) from stainless steel, since it would have been obvious for one of ordinary skill in the art to vary the materials of the apparatus, and since stainless steel is known to resist corrosion and wear. Furthermore, Kottke disclosure of a stainless steel bellows member also suggests that stainless steel is a suitable material for the components of the pump apparatus.

In Reference to Claim 5

Kottke teaches the numerically controlled reciprocating submersible pump apparatus, according to claim 1 (see the rejection of claim 1 above), characterized in that the reciprocating head's iron cores are around the reciprocating head's solid shaft with permanent magnets between the iron cores (The armature is composed of a plurality of permanent magnets (64) and a plurality of magnetically soft pole pieces (66) stacked alternately over a central arbor (65), see column 13 lines 7-17); and they form a friction couple with the supporting guides via the alloy layers on the inside surfaces of the supporting guides (the bushings (15) interface with the armature's pole pieces (66)).

Kottke fails to teach that he circular iron cores' outside surfaces are made from alloy.

Kottke does make note of a further embodiment that uses a stainless steel bellows member (310). It would have been obvious to one of ordinary skill in the art at the time of invention to form the outer surface of the iron cores from stainless steel, since it would have been obvious for one of ordinary skill in the art to vary the materials of the apparatus, and since stainless steel is known to resist corrosion and wear, and thus would protect the iron cores. Furthermore, Kottke disclosure of a stainless steel bellows member also suggests that stainless steel is a suitable material for the components of the pump apparatus.

In Reference to Claim 6

Kottke teaches the numerically controlled reciprocating submersible pump apparatus, according to claim 5 (see the rejection of claim 5 above), characterized in that the permanent magnets are equally spaced between the reciprocating head's iron cores (see figure 1 where the permanent magnets (64) are spaced between the pole pieces (66)); The magnets have smaller outside diameters than the circular iron cores (The magnets (64) are smaller in diameter than the pole pieces (66)).

Conclusion

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. U.S. Patents 5,831,353 to Bolding et al. and 7,316,270 to Shen also teach similar linear driven submerged pumps.

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to JESSICA L. MYERS whose telephone number is (571)270-5059. The examiner can normally be reached on Monday through Friday, 8:30am to 5:30pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Devon Kramer can be reached on 571-272-7118. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

15. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Devon C Kramer/
Supervisory Patent Examiner, Art Unit 3746

/JLM